## REMARKS

The Office Action mailed June 4, 2004 has been carefully considered by applicant. Reconsideration is respectfully requested in view of the foregoing amendments and the following remarks.

### Objections to the Specification

The specification has been objected to as referring to the conveyor belt as reference no. 16, whereas the drawings show the conveyor belt as reference no. 20. By the present amendment, the specification has been amended to properly refer to the conveyor belt as having reference no. 20. In addition, several portions of the specification have been amended to conform to U.S. style of English and to correct typographical errors. No new matter is added by these amendments.

### Amendments to the Drawing

Drawing Figure 2 is amended to remove the incorrect reference number designation for the reflective surface. No new matter is added by this amendment.

### Claim Objections

Claims 1-10 have been objected because of various informalities. By the present amendment, Claims 1-11 are amended to overcome the cited objections, and place same in condition for allowance.

### Allowable Subject Matter

Claim 3, 4, 8 and 11 have been objected to as being dependant upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

According to the remarks provided below, applicant asserts that amended independent Claim 1 recites allowable subject matter. Thus Claims 3, 4, 8 and 11 are retained in their dependent form and are believed in condition for allowance.

Claim Rejections Under 35 U.S.C. §103

Claims 1, 2, 5-7, 9 and 10 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Rydningen U.S. Patent No. 5,680,219 in view of Luster U.S. Patent No. 6,324,016. By the present amendment, Claims 1, 2, 5-7, 9 and 10 have been amended to more particularly point out and distinctly claim the subject matter of the present invention and render same allowable over the applied references.

Rydningen '219 relates to a device for automatic, contactless, optical video measuring of the dimension of one or more objects at rest or being conveyed parallel along a straight path. The device consists of two elongated light sources (1, 2) which are placed laterally above an object (7) such that the angle of the light sources in a plane perpendicularly to the measured object's direction of motion is 45°. Light reflected from the object passes through an aperture (8) to two parabola-shaped mirrors (3, 4) and further through a camera objective to a camera's CCD chip. The object of the invention is to provide the operator of a saw mill with the actual continuous measurements of saw cuts, and to provide an alarm if the actual values differ more than a predetermined amount from reference values.

Luster '016 teaches a reflective telecentric lens that uses an on-axis type concave mirror in a pseudo-off-axis manner to avoid blocking a portion of the field of view of the lens. In the particular embodiment shown in Figure 3, light rays (44) are reflected off of collector mirror (42). The reflected light rays are then split by beam splitter (40) and further pass through telecentric stop (46) and ultimately into imaging lens (48).

Claim 1

As amended, Claim 1 recites an apparatus based on a telecentric imaging system for forming an image of a linear zone of an object. The apparatus has a non-telecentric camera comprising an objective and an image plane formed of a row of photosensitive cells. Telecentric imaging means are placed between the objective and the object. The telecentric imaging means comprise a concave strip mirror that is substantially aligned with the row of cells. The aperture is located in the focal plane of the concave strip

mirror, and the concave strip mirror and the objective jointly form a telecentric image of the object on the row of photosensitive cells. A light source producing radiation is directed to the object. The concave strip mirror is one planar parabolic mirror and a strip-like fully reflective plane mirror is disposed between the parabolic mirror and the objective. The directed radiation reflected from the object and the parabolic mirror strikes the objective and then the image plane in order to obtain a sharp image of the width parts of the object.

Claim 1 is not anticipated, nor rendered obvious by the applied references for the following reasons. Neither of the references teach or suggest a fully-reflective strip-like plane mirror disposed between a parabolic mirror and an objective, through which directed radiation reflected from the object and the parabolic mirror strike the objective. As stated by the Examiner, Rydningen '219 fails altogether to teach or suggest a strip-like plane mirror disposed between the parabolic mirror and the objective. Luster '016 fails to cure the deficiencies of Rydningen '219, as it merely teaches placing a beam splitter (40) between collector mirror (42) and the telecentric stop (46).

In addition, neither of the references teach or suggest a telecentric imaging system having a concave strip mirror that is a planar parabolic mirror. As defined by the present application, a planar parabolic mirror is a concave mirror having a reflective surface (26) that is parabolic in shape in the direction (L2) of the mirror length and planar in shape in the width direction (W2) perpendicular to this. Page 9, lines 6-8. Rydningen '219 teaches merely parabola shaped mirrors (3,4) which do not have a planar surface. Luster '016 teaches merely a collector mirror (42) which is a paraboloid (see col. 3, lines 45-49). By definition a paraboloid has parabolic sections parallel to a single coordinate axis and elliptic sections perpendicular to that axis. Luster '016 thus fails to teach or suggest a strip like concave mirror that is parabolically shaped in one direction and planar in a direction perpendicular to that direction.

The failing of the prior art to teach the combined elements of the claimed invention is not surprising, as the prior art references are directed to completely different objectives

than the present invention. Rydningen '219 fails altogether to relate to a telecentric system. Rather, the two parabolic mirrors taught by Rydningen '219 do not, and cannot form a telecentric system, but rather form some sort of concentrator. This is especially true because Rydningen '219 teaches that the "second mirror number is quite equal to the first mirror" (column 3, lines 22-24), which excludes telecentric image forming. In the construction of Rydningen '219, a beam of parallel rays can be between the mirrors (just like in concentrators), but never between the mirror and the target.

Because of its construction, the arrangement of Rydningen '219 is economically useless. It is extremely difficult to install two parabolic mirrors so that their positions have a high enough precision with respect to each other to consistently provide the desired images in an accurate fashion. There are no such problems in the construction of Claim 1, which only utilizes a parabolic mirror and a planar mirror, as planar mirrors do not cause such problems.

Luster '016 teaches merely a system for moving a telecentric stop, imaging lens, and film or electronic detector outside the field of view. Luster '016 does not teach a telecentric imaging system which is almost totally free of imaging errors. Luster '016 teaches an apparatus that is bulky and sensitive to vibration, such that it is not useful in several of the industrial fields mentioned in the present application. For example, the pellicle-type beamsplitter is not stable enough for use in those industrial fields

In view of the comments above, Claim 1 is not anticipated or rendered obvious by the applied references.

Claims 2 and 5-7

Claims 2 and 5-7 depend directly or indirectly from Claim 1 and are thus believed allowable for the reasons stated above, as well as the subject matter recited therein.

Claim 9

Claim 9 recites a method for forming a telecentric image of an opaque object located on an opaque and non-reflective surface with a telecentric system. The method has the steps of (1) directing scattered light to the object over its entire width to be

inspected, (2) collecting radiation reflected from the object with a concave strip mirror and allowing the radiation to be re-reflected from the concave mirror as a bundle of rays, (3) providing a camera in the reflective bundle of rays, wherein an objective and a row of photosensitive cells with the objective aperture are located substantially in the focal plane of the concave strip mirror, the concave strip mirror and the objective forming a telecentric image of a linear strip of the object on the row of photosensitive cells, (4) allowing the object to move in a direction substantially perpendicular to the linear strip, (5) collecting scattered light reflected from the object with one concave planar parabolic mirror and allowing it to be re-reflected, first to a fully reflective plane mirror and from there to the camera as an undistorted telecentric image, and (6) measuring, by means of photosensitive diodes on the image plane, the values of at least one or more dimensions of the object which are at least partly parallel with the linear strip and the rows of photosensitive cells.

As discussed above regarding Claim 1, the cited references, alone or in combination, fail to teach the step of collecting scattered light reflected from the object with a concave planar parabolic mirror and allowing it to be re-reflected, first to a fully reflective plane mirror and from there to the camera as in undistorted telecentric image. Such a method is neither taught nor suggested by the cited prior art. As such, Claim 9 is believed allowable over the applied references.

Claim 10

Claim 10 depends directly from Claim 9 and is believed in condition for the reasons stated above, as well as the subject matter recited therein.

The present application is thus believed in condition for allowance with Claims 1-11. Such action is respectfully requested.

Respectfully submitted,

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